

Applicant: Kari Hasanen et al.
Application No.: 09/980,061
Art Unit: 1731

Claim Listing

1-11. (cancelled)

12. (currently amended) A method for closing a shoe, positioned within a belt, against a backing roll to form a nip between [[a]] the backing roll, the belt and [[a]] the shoe of a shoe press/shoe calender in a paper machine, the nip extending in a cross machine direction, the method comprising the steps of:

measuring the position of the shoe within the belt of the shoe calender/shoe press with respect to a reference position at at least two positions which are spaced from each other in the cross machine direction; and

closing the shoe within the belt against the backing roll while controlling the position of the shoe based on the results of the measurement so the nip is of a desired shape.

13. (previously presented) The method of claim 12 wherein the position of the shoe with respect to the reference position is measured by at least two position measuring sensors.

14. (previously presented) The method of claim 13 wherein the shoe has a driving side edge and a tending side edge, and wherein the position of the shoe is measured by a position measuring sensor close to the driving side edge, and a position sensor close to the tending side edge.

15. (previously presented) The method of claim 14 wherein a position sensor is also located in the middle of the machine, and the position of the shoe is measured by the position measuring sensor close to the driving side edge, the position measuring sensor close to the tending side edge, and the position sensor located in the middle of the machine.

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16. (previously presented) The method of claim 12 wherein the movement of the shoe is regulated based on the measurement results utilizing a computing algorithm, and hydraulic cylinders of the shoe of the shoe press/shoe calender are controlled to operate such that the shoe moves in a desired manner to a desired position.

17. (previously presented) The method of claim 12 wherein the step of closing the shoe against the backing roll includes quickly closing the nip when in the initial stages of closing, and slowing down the movement when the nip starts to be almost closed.

18. (currently amended) An arrangement for closing a shoe positioned within a belt, against a backing roll to form a nip between the backing roll and the shoe of a shoe press/shoe calender in a paper machine, the nip extending in a cross machine direction, the arrangement comprising:

a shoe roll, having a shoe, a belt within which the shoe is positioned, and hydraulic cylinders connected thereto to the shoe for moving the shoe towards and away from the backing roll;

at least two measuring devices for measuring the position of the shoe, the measuring devices being positioned to determine the position of the shoe with respect to a reference position at two positions on the shoe which are spaced in the cross machine direction; and

means for controlling the position of the shoe during the closing of the shoe against the backing roll to form the nip based on the results obtained by the measuring devices so the nip is of a desired shape.

19. (previously presented) The arrangement of claim 18 wherein the at least two measuring devices comprise position measuring sensors placed close to a tending side edge of the paper machine and a driving side edge of the paper machine.

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20. (previously presented) The arrangement of claim 19 further comprising a position measuring sensor placed in the middle of the paper machine between the tending side edge and the driving side edge.

21. (previously presented) The arrangement of claim 18 further comprising means for moving the hydraulic cylinders based on the results of the measurement in order to position the shoe in a desired position.

22. (previously presented) The arrangement of claim 18 further comprising a unit in which a computing algorithm is carried out based on the results of the measurement in order to give flow instructions to hydraulic valves which control the hydraulic cylinders such that the hydraulic cylinders move the shoe to a desired position.

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23. (previously presented) An apparatus for closing a shoe against a backing roll to form a nip between the backing roll and the shoe in a paper machine, the apparatus comprising:

- a backing roll;
- a shoe;
- a belt within which the shoe is positioned, the shoe being loaded against the backing roll to define a nip by a plurality of hydraulic cylinders;
- a frame extending within the belt, the hydraulic cylinders supporting the shoe on the frame;
- at least two position measuring sensors arranged in connection with the shoe between the shoe and the frame, the sensors measuring the position of the shoe and producing position measurements, the position measuring sensors being spaced from one another in a cross machine direction; and
- a processing unit which receives the position measurements from the position measuring sensors, the processing unit generating signals which control the hydraulic cylinders to close the shoe towards the backing roll.

24. (previously presented) The apparatus of claim 23 wherein the at least two position measuring sensors comprise:

- a position measuring sensor placed close to a tending side edge of the paper machine;
- a position measuring sensor placed close to a driving side edge of the paper machine;
- and
- a position measuring sensor placed in the middle of the paper machine.

25. (Previously presented) The method of claim 17 wherein the backing roll is a thermoroll.

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26. (Previously presented) The method of claim 12 wherein the reference position is a fixed position on a frame to which the shoe is mounted.